

High Efficiency Direct Methane Solid Oxide Fuel Cell System, Phase I

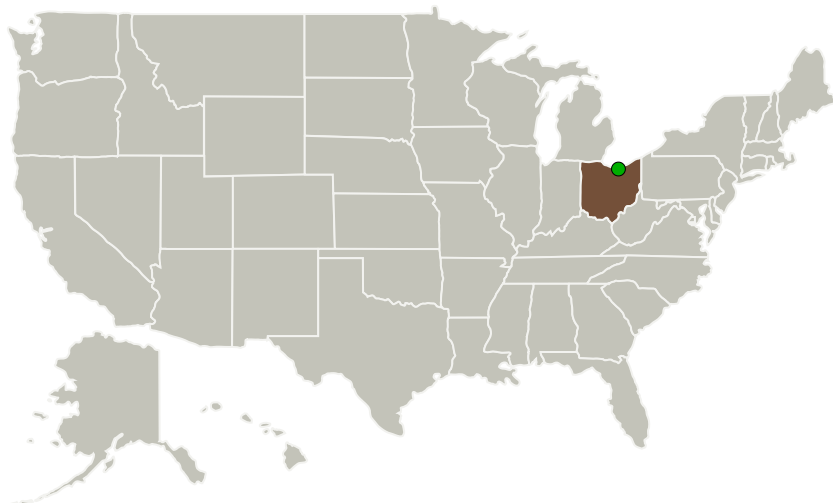
Completed Technology Project (2014 - 2014)



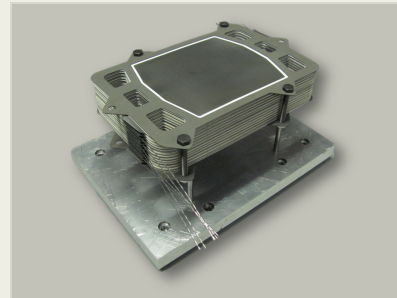
Project Introduction

NASA has a defined need for energy dense and highly efficient energy storage and power delivery systems for future space missions. Compared to other fuel cell technologies, solid oxide fuel cell (SOFC) based systems are better suited to meeting NASA's efficiency targets while operating directly on methane and oxygen reactants. SOFC power systems for lunar landers and other exploration vehicles are an ideal application for this technology, as well as for power generation on the moon or on Mars. NexTech Materials has established SOFC technology that offers high power density with direct internal fuel reforming and high single-pass fuel utilization, making it uniquely suited for achieving NASA's performance and efficiency requirements. In this project, NexTech will establish a process model for an SOFC system that operates with oxygen and methane reactants, design a lightweight and high efficiency SOFC stack, refine the stack design via modeling and analysis, validate the design and performance predictions via stack testing.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
NexTech Materials, Ltd.	Lead Organization	Industry	Lewis Center, Ohio
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio



High Efficiency Direct Methane Solid Oxide Fuel Cell System Project Image

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Primary U.S. Work Locations

Ohio

Project Transitions



June 2014: Project Start



December 2014: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140559>)

Images



Project Image

High Efficiency Direct Methane Solid Oxide Fuel Cell System Project Image
(<https://techport.nasa.gov/image/132484>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

NexTech Materials, Ltd.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Scott L Swartz

Co-Investigator:

Scott Swartz

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Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
 - └ TX03.1 Power Generation and Energy Conversion
 - └ TX03.1.4 Dynamic Energy Conversion

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System